

RESPONSE TO FINAL OFFICE ACTION

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IN THE CLAIMS

1-5. (Cancelled)

6. (Currently Amended) A method for in-situ and real-time plasma chamber condition monitoring. The method of claim 5 further comprising:

inserting a non-production wafer into a plasma chamber;

injecting a probing gas into the plasma chamber, the probing gas comprising a source of free radicals, the probing gas having including an inert gas comprising for 5 - 10 percent of the probing gas;

striking the probing gas into a probing plasma;

measuring a density of the free radicals in the probing plasma, wherein the density of the free radicals is defined as a ratio of emission intensities of the free radicals and the inert gas, and wherein the density of the free radicals is compared with a first predefined level;

determining whether to commence plasma processing of a production wafer on the basis of the measured density of the free radicals; and

taking the plasma chamber out of production in response to a determination that the density of the free radicals is below the first predefined level.

7. (Currently Amended) The method of ~~claim 4~~ claim 6 wherein the density of the free radicals is compared with a second predefined level.

8. (Previously Presented) The method of claim 7 further comprising:
processing the production wafer in response to a determination that the density of the free radicals is above the second predefined level.

9. (Currently Amended) The method of ~~claim 1~~ claim 6 wherein the free radicals in the probing plasma include at least one of Br, Cl, O or F.

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10. (Currently Amended) The method of ~~claim 4~~ claim 6 wherein the probing plasma also includes at least one of Ar or Xe.

11-15. (Cancelled)

16. (Currently Amended) A method for controlling a seasoning process in a plasma chamber ~~The method of claim 15 further comprising:~~

injecting a seasoning gas into a plasma chamber, the seasoning gas comprising a source of free radicals, and wherein the seasoning gas includes an inert gas and at least one of Br, Cl, O or F, the inert gas accounting for 5-10 percent of the seasoning gas;

striking the seasoning gas into a seasoning plasma;

seasoning the processing chamber;

measuring a density of the free radicals in the seasoning plasma, wherein the density of the free radicals is defined as a ratio of emission intensities of the free radicals and the inert gas and wherein the density of the free radicals is compared with a predefined level;

determining when the plasma chamber is seasoned according to the measured density of the free radicals; and

extinguishing the seasoning plasma when the density of the free radicals is above the predefined level.

17. (Currently Amended) The method of ~~claim 14~~ claim 16 wherein the free radicals in the ~~probing~~ seasoning plasma include at least one of Br, Cl, O or F.

18. (Previously Presented) The method of ~~claim 12~~ claim 16 wherein the inert gas comprises at least one of Ar or Xe.

19-23. (Cancelled)

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24. (Currently Amended) A method for detecting process drift in a plasma chamber

~~The method of claim 23~~ further comprising:

injecting a process gas into a plasma chamber, the process gas comprising a source of free radicals and an inert gas, the inert gas accounting for 5-10 percent of the process gas;

striking the process gas into a process plasma, wherein the process plasma includes an inert gas;

measuring a density of the free radicals in the process plasma, wherein the density of the free radicals is defined as the ratio of emission intensities of the free radicals and the inert gas;

determining an extent of process drift according to the measured density of the free radicals, wherein the density of the free radicals is compared with a predefined level;
and

deeming the plasma chamber unsuitable for production when the density of the free radicals is below the predefined level, level.

25. (Currently Amended) The method of ~~claim 19~~ claim 24, wherein the free radicals in the ~~probing process~~ plasma include at least one of Br, Cl, O or F.

26. (Currently Amended) The method of claim 25 wherein the ~~probing process~~ plasma also includes at least one of Ar or Xe.

27-30. (Cancelled)

31. (Currently Amended) The method of ~~claim 4~~ claim 6, wherein the source further comprises at least one of Br₂, Cl₂, O₂, and CF₄.

32. (Currently Amended) The method of ~~claim 14~~ claim 16, wherein the source further comprises at least one of Br₂, Cl₂, O₂, and CF₄.

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33. (Currently Amended) The method of ~~claim 19~~ claim 24, wherein the source further comprises at least one of Br₂, Cl₂, O₂, and CF₄.

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